

# Essential Health Sector Actions to Improve Maternal Nutrition in Africa

The health sector can promote and support behaviors to improve maternal nutrition. This publication identifies actions that program managers can integrate into existing health programs. For maximum effect, improving women's nutrition should begin long before pregnancy. The actions presented here, however, focus on pregnancy, a time when health systems can more easily reach women.

Implementation of the essential health sector actions will contribute to the achievement of five nutrition-related outcomes:

- 1 Adequate food intake during pregnancy and lactation**
- 2 Adequate micronutrient intake during pregnancy and lactation**
- 3 Reduction of malaria infection in pregnant women in endemic areas**
- 4 Reduction of hookworm infection in pregnant women in endemic areas**
- 5 Birth spacing of three years or longer**

Consequences of Maternal Malnutrition	
For Maternal Health	For Infant Health
<ul style="list-style-type: none"><li>♦ Increased risk of maternal death</li><li>♦ Increased infections</li><li>♦ Anemia</li><li>♦ Compromised immune functions</li><li>♦ Lethargy and weakness</li><li>♦ Lower productivity</li></ul>	<ul style="list-style-type: none"><li>♦ Increased risk of fetal and neonatal death</li><li>♦ Intrauterine growth retardation, low birth weight, preterm birth</li><li>♦ Compromised immune functions</li><li>♦ Birth defects</li><li>♦ Cretinism and reduced IQ</li></ul>

*Maternal malnutrition results in lost lives, lost health, lost opportunity, and lost income.*

Photo credit: UNICEF



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## Health Sector and Maternal Actions to Improve Maternal Nutrition in Africa

Outcomes	Essential Health Sector Actions	Maternal Actions
<b>1 Adequate food intake during pregnancy and lactation</b>	<ul style="list-style-type: none"> <li>♦ Encourage increased food intake during pregnancy and lactation</li> <li>♦ Monitor weight gain in pregnancy</li> <li>♦ Counsel on reduced energy expenditure</li> </ul>	<ul style="list-style-type: none"> <li>♦ Eat at least one extra serving of staple food per day during pregnancy and the equivalent of an extra meal per day during lactation</li> <li>♦ Gain at least one kilogram per month in the second and third trimesters of pregnancy</li> <li>♦ Rest more during pregnancy and lactation</li> </ul>
<b>2 Adequate micro-nutrient intake during pregnancy and lactation</b>	<ul style="list-style-type: none"> <li>♦ Counsel on diet diversification</li> <li>♦ Prescribe and make accessible iron/folic acid supplements OR multiple micronutrient supplements</li> <li>♦ Assess and treat severe anemia in women</li> <li>♦ Distribute vitamin A to postpartum women</li> </ul>	<ul style="list-style-type: none"> <li>♦ Increase daily consumption of fruits and vegetables, animal products, and fortified foods, especially during pregnancy and lactation</li> <li>♦ Consume daily supplements (iron/folic acid—60 mg iron + 400 µg folic acid—or multiple vitamin/mineral supplements) during pregnancy and the first three months postpartum</li> <li>♦ If anemic, consume a daily dose of 120 mg iron + at least 400 µg folic acid for three months</li> <li>♦ Consume a high dose (200,000 IU) of vitamin A immediately after delivery or within the first eight weeks after delivery if breastfeeding and within six weeks after delivery if not breastfeeding</li> </ul>
<b>3 Reduction of malaria infection in pregnant women in endemic areas</b>	<ul style="list-style-type: none"> <li>♦ Prescribe and make accessible anti-malarial curative and/or prophylactic drugs for pregnant women (according to local recommendations)</li> <li>♦ Treat clinical infections</li> <li>♦ Promote use of insecticide-treated materials</li> </ul>	<ul style="list-style-type: none"> <li>♦ In the second and third trimesters, take anti-malarial drugs as a curative treatment regardless of symptoms OR take weekly anti-malarial prophylaxis starting at first antenatal visit</li> <li>♦ Seek treatment for fever during pregnancy; take drugs to treat malaria and reduce fever; take iron/folic acid supplements to treat anemia</li> <li>♦ Use insecticide-treated materials, including bednets</li> </ul>
<b>4 Reduction of hookworm infection in pregnant women in endemic areas</b>	<ul style="list-style-type: none"> <li>♦ Counsel on preventive measures (sanitation and footwear)</li> <li>♦ Prescribe and make accessible anthelmintics after first trimester of pregnancy</li> </ul>	<ul style="list-style-type: none"> <li>♦ Wear shoes and dispose of feces carefully to prevent infection</li> <li>♦ Take a single dose of albendazole (400 mg) or a single dose of mebendazole (500 mg) in the second trimester of pregnancy as a treatment for hookworm. If hookworms are highly endemic (&gt;50 percent prevalence), take an additional dose in the third trimester of pregnancy</li> </ul>
<b>5 Birth spacing of three years or longer</b>	<ul style="list-style-type: none"> <li>♦ Promote optimal breastfeeding practices</li> <li>♦ Promote family planning as a health and nutrition intervention; counsel on the need for a recuperative period to build energy and micronutrient stores</li> <li>♦ Consider breastfeeding status when prescribing contraception</li> <li>♦ Promote safer sex</li> </ul>	<ul style="list-style-type: none"> <li>♦ Initiate breastfeeding in the first hour after birth, breastfeed exclusively for about six months, and continue breastfeeding for two years or more</li> <li>♦ Practice family planning to space births for at least three years; delay pregnancy so that there are at least six months between the period of breastfeeding and the subsequent pregnancy</li> <li>♦ Use contraceptives that protect breastfeeding</li> <li>♦ Use condoms prior to the decision to become pregnant and during pregnancy and lactation</li> </ul>

# 1 Adequate Food Intake during Pregnancy and Lactation

Between 5 to 20 percent of women in various African countries are underweight. Pregnant women in industrialized countries gain on average twice as much as pregnant women in Africa. Low weight-for-height, low pregnancy weight gain, and low birth weight reflect inadequate food intake in women. Many African women display low weight-for-height as measured by a body mass index of less than 18.5 (Figure 1).<sup>1</sup>

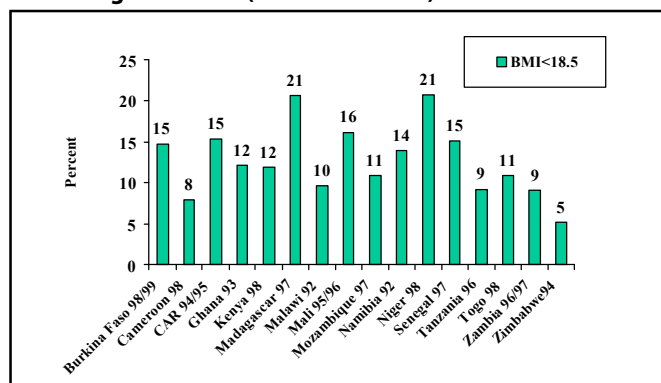
Direct consequences of chronic energy deficiency include:

- ♦ increased susceptibility to infection,
- ♦ reduced activity levels, and
- ♦ lower productivity.

Intrauterine growth retardation—largely the result of maternal malnutrition before and during pregnancy—causes approximately two-thirds of low birth weight in developing countries. Neonatal mortality rates are two to three times higher for low birth weight babies than for normal weight babies.

Infants born with intrauterine growth retardation have a higher risk of growth retardation in childhood and an increased risk of illness. They also are at greater risk of poor motor, psychosocial, intellectual, and emotional development.

**Figure 1. Low weight-for-height (Body Mass Index) among women ages 15 to 49 (DHS 1990-1998)**



## Essential Actions

### Encourage increased food intake during pregnancy and lactation

- ♦ *During pregnancy:* Pregnant women need to increase food intake by at least 200 calories per day and more if their pre-pregnancy weight was low. One serving of maize porridge and 12 groundnuts meets this additional requirement.
- ♦ *During lactation:* Most breastfeeding women in developing countries need approximately 650 additional calories—nearly the equivalent of an extra meal per day—to meet the energy needs of lactation.

Pregnant women often object to increasing food intake because they are concerned that a bigger baby will make delivery more difficult. Women may be more receptive to messages that focus on eating specific foods, giving birth to healthy babies, and feeling better during pregnancy than to messages that focus solely on eating more food.

### Monitor weight gain in pregnancy

Women should gain about one kilogram per month in the second and third trimesters of pregnancy.

### Counsel on reduced energy expenditure

African women engage in physically demanding activities requiring high levels of energy. They often maintain these activities throughout pregnancy without taking additional rest or changing their diets. Reducing workloads helps to improve women's nutritional status and increase birth weight. This message needs to be directed to male partners and other family members as well as to mothers.

<sup>1</sup> Body Mass Index (BMI) is an expression of the height in meters divided by weight in kilograms squared.

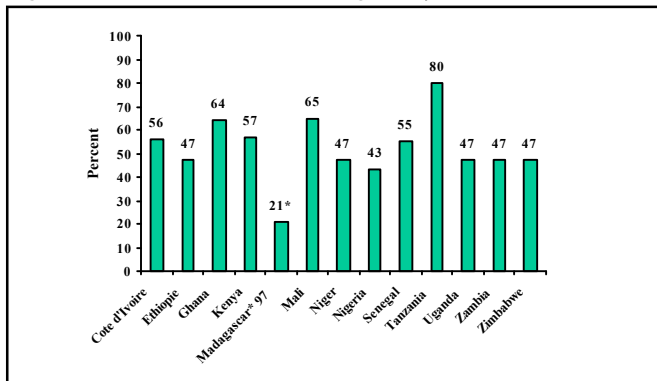
## 2 Adequate Micronutrient Intake during Pregnancy and Lactation

Improving micronutrient status through diet diversification and micronutrient supplementation is an important step to reducing maternal malnutrition. Many women display not one but several micronutrient deficiencies. Minimal intake of micronutrient-rich foods and the body's inability to absorb and use efficiently certain micronutrients account for the prevalence of multiple deficiencies.

Micronutrient deficiencies can increase the risk of maternal death and illness during pregnancy and delivery. High rates of iron deficiency anemia during pregnancy are common in Africa (Figure 2). Anemia is responsible for an estimated 20 percent of maternal deaths. Anemia increases the risk of hemorrhage and prolonged labor, which can lead to sepsis (infection). Low calcium intake can increase the risk of pre-eclampsia, high blood pressure, and hypertension. Pre-eclampsia causes about 12 percent of maternal deaths.

Micronutrient deficiencies also increase susceptibility to infections and/or their duration and severity. Iron deficiency anemia reduces resistance to disease, causes weakness and fatigue, and lowers productivity.

**Figure 2. Rates of anemia in pregnancy in Africa**



Source: Population Action International 1995, \*DHS (Madagascar)

The micronutrient status of pregnant and lactating women affects infant survival, growth, and development.

- ♦ **Multiple deficiencies** in zinc, iron, iodine, vitamin A, folic acid, vitamin B<sub>6</sub>, vitamin B<sub>12</sub>, vitamin D, calcium, and magnesium can increase the risk of low birth weight, preterm births, premature rupture of membranes, and fetal death.
- ♦ **Folate deficiency** causes neural tube defects, cleft palate, and urinary tract and limb defects.
- ♦ **Iodine deficiency** affects fetal brain development, growth, school achievement, and intelligence.

- ♦ **Vitamin A deficiency** results in reduced fetal stores and lower levels of vitamin A in breastmilk. Infants and young children who are vitamin A deficient are at an increased risk of appetite loss, eye problems, lower resistance to infections, more frequent and severe episodes of diarrhea and measles, iron deficiency anemia, and growth failure. Increased risk of illness leads to an increased risk of death.

### Essential Actions

#### Counsel on diet diversification

During antenatal, immediate postpartum, postnatal, and family planning contacts, women should be asked about their diet and affordable foods and counseled on ways to increase consumption of the following:

- ♦ **Fruits and vegetables:** Increased daily consumption of green leafy and yellow orange fruits and vegetables will improve the status of many micronutrients.
- ♦ **Animal products:** Meat, milk, and eggs are excellent sources of protein, fat, and micronutrients. Many micronutrients in animal products are more easily absorbed and/or used by the body than those found in fruits and vegetables.
- ♦ **Iodized salt:** Promotion of iodized salt for use by the entire family is a public health priority. Iodine requirements increase during pregnancy.
- ♦ **Fortified foods:** Fortification of flour and other common foods with iron and other nutrients can improve micronutrient intake.

#### Prescribe and make accessible iron/folic acid supplements or multiple micronutrient supplements for pregnant women

Diet cannot meet all of the iron requirements of pregnant women, especially those who begin pregnancy with low stores. Large amounts of iron are lost during pregnancy—due to tissue synthesis in the mother, placenta, and fetus—and during delivery.

Iron supplements can prevent and treat iron deficiency anemia in pregnant women. Health programs should assess whether a pregnant woman is severely anemic (generally defined as a hemoglobin level less than 7 g/dl). Pallor (extreme paleness) at either the conjunctiva or palms indicates severe anemia. Table 1 provides iron supplementation guidelines for pregnant women.

**Table 1. Iron Supplementation in Pregnancy**

<b>Iron Supplementation to PREVENT ANEMIA in pregnant women</b>		
Prevalence of anemia in pregnant women	Dose*	Duration**
< 40 percent	60 mg iron + 400* µg folic acid daily	6 months of pregnancy
≥ 40 percent	60 mg iron + 400* µg folic acid daily	6 months of pregnancy and continuing to 3 months postpartum
	* If iron supplements with 400* µg folic acid are unavailable, an iron supplement with less folic acid may be used.	** If 6 months duration cannot be achieved in pregnancy, continue to supplement during the postpartum period for 6 months or increase the dose to 120 mg in pregnancy.
<b>Iron supplementation to TREAT SEVERE ANEMIA in pregnant women</b>		
	120 mg iron + at least 400 µg folic acid daily	3 months (after completing this treatment, pregnant women should continue preventive supplementation as shown above)

Iron, as well as other micronutrients, can also be supplied through multiple micronutrient supplements. Multiple micronutrient supplements during pregnancy should contain appropriate levels of various nutrients, as those shown in Table 2. Many supplements sold are not suitable because the number or levels of nutrients are inappropriate.

**Table 2. Composition of Proposed Interim UNICEF Multiple Micronutrient Supplement**

Nutrient	Levels	Nutrient	Levels
Vitamin A RE	800	B <sub>6</sub> mg	1.9
Vitamin A IU	2664 retinol	B <sub>12</sub> µg	2.6
Vitamin D IU	200	Vitamin C mg	70
Vitamin E IU	10	Zinc mg	15
B <sub>1</sub> (Thiamin) mg	1.4	Iron mg	30
B <sub>2</sub> (Riboflavin) mg	1.4	Iodine mg	150
Niacin mg	18	Selenium µg	65
Folic acid µg	400	Copper mg	2

**Distribute vitamin A to postpartum women**

The health sector can help prevent vitamin A deficiency by providing lactating women in endemic areas with a high-dose vitamin A capsule (200,000 IU) as soon after delivery as possible. Because high doses of vitamin A during pregnancy can cause birth defects, they should not be given to pregnant women. That means that high-dose vitamin A must be administered in the first six to eight weeks postpartum since women are at risk of becoming pregnant by six weeks postpartum if not breastfeeding and by eight weeks postpartum if breastfeeding.

*Unless women's nutrition receives high priority in communities and nations, progress will be limited in achieving goals in the health and economic sectors and in the development of human resources.*

### 3 Reduction of Malaria Infection in Pregnant Women in Endemic Areas

More than 90 percent of all malaria cases are in sub-Saharan Africa. Malaria increases the risk of anemia, intrauterine growth retardation, and preterm delivery. Malaria causes anemia by destroying red blood cells and suppressing the process for developing these cells.

In many malarious areas, malaria is the major cause of anemia. Pregnant women develop malaria more frequently and have more severe infections than non-pregnant women. Women in their first pregnancies are at increased risk for malaria. Because their levels of immunity against malaria infections are lower, women living in areas of low transmission of malaria experience more severe consequences from malaria than women in areas of high transmission.

#### Essential Actions

##### **Prescribe and make accessible anti-malarial curative and/or prophylactic drugs for pregnant women**

Health programs can prevent malaria infections among pregnant women in endemic areas by giving drug prophylaxis to all pregnant women, regardless of whether or not they show signs of infection. This can be done by prescribing either small doses of anti-malarial drugs every week or several larger treatment doses.

Health workers should give curative treatment at the first antenatal visit—but not during the first trimester followed by prophylaxis, depending on national protocol. Treatment and prevention protocols need to be clearly explained to the mother. The three main treatment regimens during pregnancy are:

- ♦ Two curative doses of sulfadoxine-pyrimethamine (often referred to as Fansidar), one in the second trimester of pregnancy and the other in the third trimester
- ♦ Three curative doses of sulfadoxine-pyrimethamine sometime during the second and third trimesters
- ♦ Weekly chloroquine prophylaxis throughout pregnancy in the few remaining areas in Africa that are not resistant to chloroquine.

##### **Treat clinical infections**

In addition to the anti-malarial drugs (sulfadoxine-pyrimethamine or chloroquine), a woman with a clinical case of malaria should receive drugs to reduce fever and iron/folic acid supplements to treat anemia. To protect the fetus, several anti-malarial drugs—tetracycline, doxycycline, primaquine, halofantrine, and artemisinin derivatives—should *not* be used during pregnancy.

##### **Promote use of insecticide-treated materials**

Use of insecticide-treated bednets and curtains can lower pregnant women's risk of being bitten by mosquitoes carrying malaria.

### 4 Reduction of Hookworm Infection in Pregnant Women in Endemic Areas

Hookworm infection is common in rural areas of the tropics and subtropics. In sub-Saharan Africa, women—who contribute 60 to 80 percent of agricultural labor to produce food for sale and for the household—are more likely to be affected by hookworm infection than other workers. Hookworm causes chronic blood loss, resulting in iron deficiency anemia. Hookworms attach to and feed upon the intestinal lining. The amount of blood lost with a heavy hookworm infection can be substantial. A hookworm infection of moderate intensity may cause a woman to lose as much or more iron as the additional amount needed during pregnancy.

The degree of iron deficiency or anemia associated with hookworm infection is dependent on a number of variables:

- ♦ Worm burden (intensity and duration)
- ♦ Type of hookworm (*A. duodenale* causes more blood loss than *N. americanus*)
- ♦ Woman's iron reserves and diet
- ♦ Woman's overall nutritional status

#### Essential Actions

##### **Counsel on preventive measures**

Preventive measures include appropriate disposal of human waste and use of footwear to protect feet from contaminated soil. Hookworm infection occurs mainly through physical contact with soil contaminated by human feces.

##### **Prescribe and make accessible anthelmintics during pregnancy**

Deworming compares favorably with other interventions to improve women's iron status. During antenatal contacts, health workers should give pregnant women in hookworm endemic areas a treatment once in the *second* trimester. Several safe and effective drugs are available to treat hookworm infection. The most commonly used anthelmintic drugs are:

- ♦ Albendazole (single dose of 400 mg) or
- ♦ Mebendazole (single dose of 500 mg or 100 mg twice daily for three days)

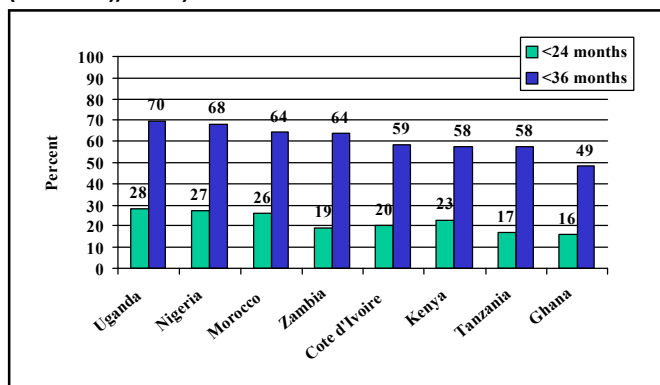
If hookworms are highly endemic—greater than 50 percent prevalence—health workers should give pregnant women an additional dose of the drug in the third trimester.

### 6 Improving Maternal Nutrition

## 5 Birth Spacing for Three Years or Longer

Extending birth spacing and giving women longer non-pregnant, non-lactating intervals provides them the time they need to replenish their energy and micronutrient stores. As well as improving maternal nutrition, longer birth intervals improve child survival and health. An inter-pregnancy interval of 39 months allows for six months of exclusive breastfeeding, followed by at least 18 months of breastfeeding and complementary feeding, and at least six months of neither pregnancy nor lactation. The length of birth intervals in many African countries is often much shorter (Figure 3) with more than half of birth intervals less than 36 months. Surveys show that many women in Africa would prefer to have longer birth intervals.

**Figure 3. Percent of birth intervals that are short (DHS (Rutstein), 1999)**



### Essential Actions

#### Promote optimal breastfeeding practices

The first step to birth spacing in Africa is to ensure that breastfeeding rates are maintained and that the fertility-inhibiting impact of breastfeeding is maximized. In Africa—where contraceptive prevalence is low—the contribution of breastfeeding to birth spacing is many times greater than that of all modern contraceptives combined.

Optimal breastfeeding practices include:

- Early initiation of breastfeeding (within the first hour after delivery)
- Exclusive breastfeeding for about six months
- Continued breastfeeding along with complementary foods from about six months through two years or more

These practices support child spacing as well as child survival and women's health. Putting the baby to the breast immediately after delivery may reduce a mother's risk of postpartum hemorrhage since suckling stimulates the release of oxytocin, which helps to trigger uterine contractions. Breastfeeding lengthens the duration of postpartum amenorrhea (the absence of menstrual bleeding). Amenorrhea helps a woman recover her iron stores lost in pregnancy.

#### Promote family planning as a health and nutrition intervention

To achieve longer birth intervals, women need to have access to family planning methods. Health workers should discuss with women different family planning options and refer them to appropriate services. Women and their partners should be provided with a full range of safe and effective contraceptive methods from which to choose. Modern methods for birth spacing include: condoms, spermicides, sterilization, oral contraceptives, vaginal barrier options, intrauterine devices, Natural Family Planning, the Lactational Amenorrhea Method (LAM),<sup>2</sup> as well as implants, injections, and other progestin-only contraceptives.

#### Consider breastfeeding status when prescribing contraception

Breastfeeding women have special reproductive health needs that need to be addressed when choosing a family planning method. Service providers often fail to ask women about their breastfeeding status. Many are unaware that initiation of some methods, in particular combined hormonal pills and injectables, should be delayed during breastfeeding. In addition to including the Lactational Amenorrhea Method in the contraceptive method mix, family planning providers should be aware of the special needs of breastfeeding women.

#### Promote safer sex

To help reduce the risk of HIV infection in mothers and their infants, health workers should be trained to promote dual protection and to make condoms accessible to clients at all times: prior to the decision to become pregnant, during pregnancy, and postpartum. Dual protection refers to protection against both pregnancy and HIV and other sexually-transmitted infections (STIs). Dual protection can be achieved through the use of condoms (male or female) alone or along with another contraceptive method. Even through breastfeeding women will be protected from pregnancy and STIs with condoms, using LAM along with condoms will provide additional benefits to the mother and her child.

<sup>2</sup> LAM is a highly effective method for contraception that health programs can easily integrate into both maternal and child health services. Three criteria are required for LAM use: 1) woman's menstrual periods have not resumed, AND 2) the baby is fully or nearly fully breastfed, AND 3) the baby is less than six months old.

## Implementation of the Essential Actions

For health workers to implement the essential actions to improve maternal nutrition, they need:

- **Knowledge** of the technical basis for the recommended actions
- **Clear, accurate, and relevant messages** that address women's specific fears, concerns, and constraints
- **Locally appropriate solutions**
- **Counseling skills** based on understanding, respect, and honesty
- **Communication tools**, such as counseling cards, that reinforce key messages
- **Reliable supplies** of micronutrient supplements, malaria drugs, hookworm medication, and contraceptives

For maximum effect, the health sector should take a life cycle approach to women's nutrition, from childhood through adolescence and maturity. Nutritional neglect at any stage can have long-term negative consequences. For example, stunting in early childhood increases the risks of obstructed labor. Low pre-pregnancy weight is associated with intrauterine growth retardation.

The health sector should also coordinate with other sectors—such as education and agriculture—and with community-based organizations that address behavioral, social, and economic factors that influence nutrition. Complementary interventions to improve maternal health include those that increase educational opportunities, income, and the status of women. The essential health sector actions need to be supported by efforts to ensure food security, just allocation of resources, and gender equity.

## Maternal Nutrition Resources

*The Case for Promoting Multiple Vitamin/Mineral Supplements for Women of Reproductive Age in Developing Countries.* S. Huffman, J. Baker., J. Shumann, E. Zehner, The LINKAGES Project. November 1998.

*Essential Health Sector Actions to Improve Maternal Nutrition in Africa.* S. Huffman, E. Zehner, P. Harvey, L. Martin, E. Piwoz, K. Ndure, C. Combest, R. Mwadime, V. Quinn, The LINKAGES Project. April 2001.

*FAQ Sheet—Frequently Asked Questions on: Breastfeeding and Maternal Nutrition.* The LINKAGES Project. June 2000.

*Integrating Essential Maternal and Child Nutrition Actions into Health Sector Programs* Regional Quality of Care Centre and the LINKAGES Project. (forthcoming)

*Maternal Nutrition: Issues and Interventions. A Computer-based Slide Presentation for Advancing Maternal Nutrition.* The LINKAGES Project. September 2000.

*Nutrition Job Aids for Regions with High HIV Prevalence.* Regional Quality of Care Centre and the LINKAGES Project. March 2002.

*Nutrition Job Aids for Regions with Low HIV Prevalence.* Regional Quality of Care Centre and the LINKAGES Project. March 2002.

*Recommended Feeding and Dietary Practices to Improve Infant and Maternal Nutrition.* The LINKAGES Project. February 1999.



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LINKAGES ■ Academy for Educational Development ■ 1825 Connecticut Avenue, NW, Washington, DC 20009  
Phone (202) 884-8000 ■ Fax (202) 884-8977 ■ E-mail [linkages@aed.org](mailto:linkages@aed.org) ■ Website [www.linkagesproject.org](http://www.linkagesproject.org)